This listing of claims will replace all prior versions, listings, of claims in the application:

Listing of Claims:

1-13. (canceled)

14. (currently amended) A method for detecting simultaneously at least two analytes in a medium using light diffraction, comprising:

providing a substrate including a surface and on said surface a first pre-selected pattern of first analyte-specific receptors and at least a second pre-selected pattern including second analyte-specific receptors, wherein each of said pre-selected patterns on said surface is distinct and, when bound to an analyte, gives rise to a pre-selected diffraction pattern distinct from ~~any other diffraction pattern when the analyte-specific receptor which forms said pre-selected pattern is bound to the appropriate analyte~~ diffraction patterns formed from all other unbound and bound pre-selected patterns on the surface;

contacting said surface of said substrate with said medium for a sufficient time to permit analytes present in said medium to bind to their associated analyte-specific receptors; and

illuminating said substrate and detecting, at a position spaced from the substrate surface, an image of diffracted light from said substrate surface and analysing the image of diffracted light for the presence or absence of each of said pre-selected diffraction patterns representative of binding of said analytes to their associated analyte-specific receptors and identifying from the image of diffracted light the presence or absence of said analytes in said medium.

15. (previously presented) The method according to claim 14 wherein illuminating the substrate includes illuminating a sufficient area of the substrate to illuminate at least a part of each pattern present on the substrate.

16. (original) The method according to claim 14 wherein illuminating said substrate includes illuminating the patterns one a time.

17. (previously presented) The method according to claim 15 wherein analysing the image of diffracted light for the presence of diffraction patterns representative of binding of one or more analytes to their analyte-specific receptors includes storing the image of diffracted light from the illuminated area.

18. (previously presented) The method according to claim 15 including detecting an image of diffracted light from the substrate surface prior to exposure of the substrate surface to the medium for producing a baseline diffraction image due to said substrate and analyte-specific receptor patterns in the absence of analytes, including storing said baseline diffraction image.

19. (previously presented) The method according to claim 18 wherein analysing the image of diffracted light for the presence of diffraction patterns representative of binding of one or more analytes with their analyte-specific receptors includes comparing image of diffracted light with the baseline diffraction image.

20. (previously presented) The method according to claim 15 wherein illuminating said substrate includes illuminating with a substantially coherent, monochromatic laser beam.

21. (original) The method according to claim 20 wherein said laser emits light in the infrared, visible or ultraviolet.

22. (original) The method according to claim 14 wherein said substrate is substantially transparent and said surface is illuminated from one side of said substrate, and wherein said light diffracted from said substrate is detected on the opposite side of said substrate.

23. (original) The method according to claim 14 wherein said substrate is partially reflecting and said surface is illuminated from one side thereof, and wherein diffracted light is detected on the same side of said substrate.

24. (original) The method according to claim 14 wherein said substrate is reflecting, and said surface is illuminated from one side thereof, and wherein diffracted light is detected on the same side of said substrate.

25. (original) The method according to claim 14 wherein after contacting said surface of the substrate with a medium being screened for preselected analytes said substrate is rinsed and dried prior to being illuminated.

26. (original) The method according to claim 14 wherein contacting said surface of the substrate with the medium includes placing said substrate in a cell containing said medium being screened for analytes, said cell having at least one optical window for light to pass therethrough for detecting for analytes in said medium in situ.

27. (original) The method according to claim 26 wherein intensities of selected regions of the resulting diffraction image are monitored as a function of time.

28. (original) The method according to claim 14 wherein the light illuminating said substrate is directed toward said substrate at an effective angle such that it undergoes total internal reflection from the substrate/medium interface.

29. (original) The method according to claim 14 wherein said analyte-specific receptors are one of a member of a binding pair selected from the group consisting of antibody-antigen, enzyme-inhibitor, complementary strands of nucleic acids or oligonucleotides, receptor-hormone, receptor-effector, enzyme-substrate, enzyme-cofactor, glycoprotein-carbohydrate, binding protein-substrate, antibody-hapten, protein-ligand, protein-nucleic acid, protein-small

molecule, protein-ion, cell-antibody to cell, small molecule-antibody to said small molecule, chelators to metal ions and air-born pathogens to associated air-born pathogen receptors.

30. (original) The method according to claim 14 wherein said substrate is selected from the group consisting of glass, mica, polished silicon, silicon dioxide, polymeric materials, substantially transparent polymeric materials, partially or fully reflective substrates including metals, and metal coated substrates.

31. (original) The method according to claim 14 including contacting said surface of the substrate with a medium containing a standard material that binds to the bound analytes after contacting said surface of the substrate with the medium being screened and prior to illuminating said selected area of said surface.

32. (original) The method according to claim 31 wherein said standard material is selected from the group consisting of proteins, metal colloids, polymer colloids, colloidal silica, quantum dots, or combinations thereof.

33. (original) The method according to claim 14 wherein the medium is selected from the group consisting of blood, serum, plasma, urine.

34-65. (canceled)

66. (previously presented) The method according to claim 18 wherein the step of analyzing the image of diffracted light includes analysing for differences in intensity between the image of diffracted light and the baseline diffraction image.

67. (previously presented) The method according to claim 14 wherein the at least two patterns interpenetrate each other.

68. (currently amended) A method for detecting simultaneously at least two analytes in a medium using light diffraction, comprising:

providing a substrate including a surface comprising glass, mica, polished silicon, silicon dioxide, a polymeric material, or a substantially transparent polymeric material, and on said surface a first pre-selected pattern of a first analyte-specific receptors and at least a second pre-selected pattern including second analyte-specific receptors, wherein each pre-selected pattern, when bound to an analyte, gives rise to a pre-selected-diffraction pattern distinct from ~~any other diffraction patterns on said surface of said substrate when the analyte-specific receptor which forms said pre-selected pattern is bound to the appropriate analyte~~ diffraction patterns formed from all other unbound and bound pre-selected patterns on the surface;

contacting said surface of said substrate with said medium for a sufficient time to permit analytes present in said medium to bind to their associated analyte-specific receptors; and

illuminating the substrate and detecting, at a position spaced from the substrate surface, an image of diffracted light from said substrate surface and analyzing the image of diffracted light for presence or absence of each of said pre-selected diffraction patterns representative of binding said analytes to their associated analyte-specific receptors and identifying from the image of diffracted light the presence or absence of said analytes in said medium.

69. (previously presented) The method of claim 68, wherein said polymeric material is polystyrene.

70. (previously presented) The method of claim 14 including quantitatively determining an amount of the analytes present by measuring intensities at appropriate parts of the diffraction image.

71. (New) A method for detecting simultaneously at least two analytes in a medium using light diffraction, comprising:

providing a substantially transparent substrate including a surface and on said surface a first pre-selected pattern of first analyte-specific receptors and at least a second pre-selected pattern including second analyte-specific receptors, wherein each of said pre-selected patterns on said surface is distinct and, when bound to an analyte, gives rise to a pre-selected diffraction pattern distinct from diffraction patterns formed from all other unbound and bound pre-selected patterns on the surface;

contacting said surface of said substrate with said medium for a sufficient time to permit analytes present in said medium to bind to their associated analyte-specific receptors; and

illuminating said substrate and detecting, at a position spaced from the substrate surface, an image of diffracted light from said substrate surface and analysing the image of diffracted light for the presence or absence of each of said pre-selected diffraction patterns representative of binding of said analytes to their associated analyte-specific receptors and identifying from the image of diffracted light the presence or absence of said analytes in said medium, wherein said surface is illuminated from one side of said substrate, and wherein said light diffracted from said substrate is detected on the opposite side of said substrate.

72. (New) The method according to claim 71 wherein illuminating the substrate includes illuminating a sufficient area of the substrate to illuminate at least a part of each pattern present on the substrate.

73. (New) The method according to claim 71 wherein illuminating said substrate includes illuminating the patterns one a time.

74. (New) The method according to claim 72 wherein analysing the image of diffracted light for the presence of diffraction patterns representative of binding of one or more analytes to their analyte-specific receptors includes storing the image of diffracted light from the illuminated area.

75. (New) The method according to claim 72 including detecting an image of diffracted light from the substrate surface prior to exposure of the substrate

surface to the medium for producing a baseline diffraction image due to said substrate and analyte-specific receptor patterns in the absence of analytes, including storing said baseline diffraction image.

76. (New) The method according to claim 75 wherein analysing the image of diffracted light for the presence of diffraction patterns representative of binding of one or more analytes with their analyte-specific receptors includes comparing image of diffracted light with the baseline diffraction image.

77. (New) The method according to claim 72 wherein illuminating said substrate includes illuminating with a substantially coherent, monochromatic laser beam.

78. (New) The method according to claim 77 wherein said laser emits light in the infrared, visible or ultraviolet.

79. (New) The method according to claim 71 wherein contacting said surface of the substrate with the medium includes placing said substrate in a cell containing said medium being screened for analytes, said cell having at least one optical window for light to pass therethrough for detecting for analytes in said medium in situ.

80. (New) The method according to claim 71 wherein intensities of selected regions of the resulting diffraction image are monitored as a function of time.

81. (New) The method according to claim 71 wherein after contacting said surface of the substrate with a medium being screened for preselected analytes said substrate is rinsed and dried prior to being illuminated.

82. (New) The method according to claim 71 wherein said analyte-specific receptors are one of a member of a binding pair selected from the group

consisting of antibody-antigen, enzyme-inhibitor, complementary strands of nucleic acids or oligonucleotides, receptor-hormone, receptor-effector, enzyme-substrate, enzyme-cofactor, glycoprotein-carbohydrate, binding protein-substrate, antibody-hapten, protein-ligand, protein-nucleic acid, protein-small molecule, protein-ion, cell-antibody to cell, small molecule-antibody to said small molecule, chelators to metal ions and air-born pathogens to associated air-born pathogen receptors.

83. (New) The method according to claim 71 including contacting said surface of the substrate with a medium containing a standard material that binds to the bound analytes after contacting said surface of the substrate with the medium being screened and prior to illuminating said selected area of said surface.

84. (New) The method according to claim 83 wherein said standard material is selected from the group consisting of proteins, metal colloids, polymer colloids, colloidal silica, quantum dots, or combinations thereof.

85. (New) The method according to claim 71 wherein the medium is selected from the group consisting of blood, serum, plasma, urine.